

(b) Bulkhead panels used in Class B-15 construction and as a component in Class A-30 or Class A-15 construction shall meet the thermal insulation requirements of §164.008-4(a) for at least 15 minutes, and the integrity requirements of §164.008-4(b) for at least 30 minutes.

(c) Bulkhead panels for use as a component in Class A-60 construction shall meet the thermal insulation requirements of §164.008-4(a) for at least 15 minutes and the integrity requirements of §164.008-4(b) for at least 60 minutes.

(d) The product shall be so marked as to be readily identifiable to an inspector in the field. The marking shall include the Coast Guard approval number.

(e) The specimen to be tested shall be representative of the typical installation on board a vessel and any limitations shall be shown on the sketch required by §164.008-7(a)(7).

(f) The bulkhead panel shall successfully pass the retests required by §164.008-6.

**§ 164.008-3 Testing procedure.**

(a) *Tests.* All tests, including the retests, shall be conducted at the National Bureau of Standards or other laboratories designated by the Coast Guard.

(b) *Preparation of test specimen.* (1) The test specimens shall be conditioned to approximately constant weight with the air being maintained at a relative humidity of 40 to 70 percent and a temperature of 15° to 25 °C. (59° to 77 °F.). After conditioning, but before testing, the temperature of the specimen should not exceed 40 °C. (104 °F.).

(2) The specimens shall be mounted in the furnace in a vertical position in such a way as to give an exposed surface of at least 4.65 square meters (50 square feet) and a height of at least 2.44 meters (8 feet).

(3) The specimen shall be supported at the top and secured on the vertical sides and at the bottom in a manner representative of conditions in service. If provision for movement at the edges of a bulkhead panel is made for a particular construction in service, the

specimen should stimulate these conditions.

(4) The method of securing shall be such that there is no possibility of misinterpretation of test results due to the passage of flame at the edges of the specimen when the method of fixing is not the subject of the test.

(c) *Furnace control.* (1) The furnace temperature shall be determined by at least four mineral insulated thermocouples having rapid response and distributed so as to represent fairly the furnace temperature and to insure as uniform heating as possible. The thermocouples shall be arranged so that the hot junction is approximately 10 cm. (4") from the nearest point of the specimen.

(2) The furnace temperature shall be continuously controlled so as to follow the standard time-temperature curve within the accuracy specified in paragraph (c)(4) of this section.

(3) The standard time-temperature curve is defined by a smooth curve drawn through the following points:

At the beginning of the test, 20 °C. (68 °F.).  
At the end of the first 5 minutes, 538 °C. (1,000 °F.).  
At the end of the first 10 minutes, 704 °C. (1,300 °F.).  
At the end of the first 30 minutes, 843 °C. (1,550 °F.).  
At the end of the first 60 minutes, 927 °C. (1,700 °F.).

For a further definition of the time-temperature curve, see Appendix I of the ASTM Standard E119, "Fire Tests of Building Construction and Materials".

(4) The accuracy of the furnace control shall be such that the area under the mean time-temperature curve is within 15 percent of the area under the standard curve during the first 10 minutes of the test, within 10 percent during the first one-half hour, and within 5 percent for any period after the first one-half hour. At any time after the first 10 minutes of the test the mean furnace temperature shall not differ from the standard curve by more than 100 °C. (180 °F.). Consideration will be given to adjusting the results for variation of the furnace exposure from that prescribed. If corrections are made, they shall be in accordance with the procedures set forth in ASTM E-119.

(5) The pressure in the furnace shall be equal to that in the laboratory at about one-third of the height of the specimen.

(d) *Temperature of unexposed surface.* For the unexposed surface temperature measurement, a thermocouple of 0.5 mm. (0.020") diameter wires shall be soldered centrally with high temperature solder to one surface of a disc of copper 12 mm. diameter and 0.2 mm. thick. The discs shall be covered with an oven-dry asbestos pad 50 mm. × 50 mm. and 4 mm. thick. The disc and the pad may be fixed to the surface of the specimen by pins, tape or a suitable adhesive, depending on the nature of the specimen material. The asbestos pad shall have a density of approximately 1,000 kg./m.<sup>3</sup> and thermal conductivity of 0.11 kcal./m./hr. × C. at 100 °C. (212 °F.).

(e) *Flame penetration.* (1) Where cracks or openings are formed during the test, an ignition test as prescribed in §164.008-4(b) shall take place immediately after the appearance of cracks or damage, followed by similar tests at frequent intervals. The purpose of the test is to indicate whether cracks and openings formed during the test are such that they would lead to passage of flame.

(2) The cotton wool used for the tests prescribed in §164.008-4(b) shall consist of new undyed soft fibers without any admixture of artificial fibers, and shall be free from thread, leaf, and shell fiber dust. A suitable material for this purpose is sold in the form of rolls for surgical use. A pad shall be cut measuring 10 cm. × 10 cm. approximately 2 cm. thick and weighing between 3 and 4 grams. It shall be oven-dried prior to the test. The pad shall be attached by means of wire clips to a 10 cm. × 10 cm. frame of 1 mm. diameter. A wire handle approximately 75 cm. long attached to the frame would facilitate its use on the specimen.

(3) When testing for cracks or openings during the test, the pad shall be held in a vertical position facing the crack or opening with the aperture located in a central part of the cotton wool. The pad may be reused if it has not absorbed any moisture or become charred during the previous application.

(f) *Temperature observations.* (1) All observations shall be taken at intervals not exceeding 5 minutes. The surface temperatures on the unexposed side of the test specimen shall be measured by thermocouples located as follows:

(i) One thermocouple located approximately in the center of each quadrant of the steel plate (four thermocouples total).

(ii) One thermocouple close to the center of the test specimen, but away from the joint, if any.

(iii) At least one thermocouple at the vertical joint of the test specimen.

(iv) Further thermocouples at the discretion of the testing laboratory or Coast Guard for the purpose of determining the temperature at points deemed likely to give a greater temperature rise than any of the above mentioned thermocouples.

(2) The average temperature rise on the unexposed surface shall be obtained by averaging the readings of the thermocouples mentioned in paragraphs (f)(1) (i) and (ii) of this section.

(g) *Other observations.* Throughout the test, observations shall be made of all changes and occurrences, which are not criteria of performance but which may create hazard in case of a fire; for example the emission of appreciable volumes of smoke or noxious vapors from the unexposed side of the test specimen. The specimen shall be examined after the test for changes that have taken place and the information shall be noted in the test report.

(h) *Duration of testing.* The test shall be continued for at least 30 minutes to meet the requirements of §164.008-2(b) or at least 60 minutes to meet the requirements of §164.008-2(c). In either case, the test shall be continued until the maximum surface temperature rise values noted in §164.008-4(a) have been reached, or until cracks which lead to flaming as specified in §164.008-4(b) are formed.

#### § 164.008-4 Test requirements.

(a) *Thermal insulation:* The insulation value of the specimens for the full scale test shall be such that the average temperature of thermocouples on the unexposed surface described in §164.008-3(f)(2) will not rise more than